U.S. NAVY MEDICINE

September-October 1985

POLICY: *U.S. Navy Medicine* is an official publication of the Navy Medical Department published by the Naval Medical Command. It disseminates to Navy Medical Department personnel official and professional information relative to medicine, dentistry, and the allied health sciences. Opinions expressed are those of the authors and do not necessarily represent the official position of the Department of the Navy, the Naval Medical Command, or any other governmental department or agency. Trade names are used for identification only and do not represent an endorsement by the Department of the Navy or the Naval Medical Command. Although *U.S. Navy Medicine* may cite or extract from directives, official authority for action should be obtained from the cited reference.

DISTRIBUTION: *U.S. Navy Medicine* is distributed to active duty Medical Department personnel via the Standard Navy Distribution List. The following distribution is authorized: one copy for each Medical, Dental, Medical Service, and Nurse Corps officer; one copy for each 10 enlisted Medical Department members. Requests to increase or decrease the number of allotted copies should be forwarded to *U.S. Navy Medicine* via the local command.

U.S. NAVY MEDICINE is published from appropriated funds by authority of Department of the Navy, Naval Medical Command, in accordance with Navy Publications and Printing Regulations P-35. Second class postage paid at Philadelphia, PA, and additional mailing offices. ISSN 0364-6807. Articles, letters, and address changes may be forwarded to the Editor *U.S. Navy Medicine*, Department of the Navy, Naval Medical Command (MEDCOM 00D4), Washington, DC 20372-5120. Telephone (Area Code 202) 653-1237, 653-1297; Autovon 294-1237, 294-1297. Contributions from the field are welcome and will be published as space permits, subject to editing and possible abridgment.

For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.

NAVMED P-5088

POSTMASTER: Send change of address orders to U.S. Naval Publications and Forms Center, ATTN: Code 306, 5801 Tabor Avenue, Philadelphia, PA 19120.

U.S. NAVY MEDICINE

Vol. 76, No. 5
September-October 1985

COVER: President Reagan thanks the staff of Naval Hospital Bethesda following his recent surgery. Photo by HM3 Thomas Kelley, NSHS, Bethesda, MD.

From the Commander

Since assuming this command in July, I have been particularly mindful of the challenge the Navy Medical Department has been and is facing—a challenge and an opportunity. The period of public scrutiny has perhaps peaked but is far from over. I consider it my prime responsibility to lead us through this period while insuring, at the same time, that we continue to perform at the high level of efficiency we are known for and the Navy and Marine Corps expect of us. It is my individual responsibility and our collective responsibility to do our best to make the Naval Medical Command better. It is time for us to place our concentration where it should be—on doing the best job we can today while keeping an eye open for the opportunity to improve in the future.

Professions generally have a privileged status in American society, and medicine is more privileged than most. But with that goes a special vulnerability. Dissatisfaction with the stewardship of those who have been especially privileged can trigger change in the name of reform that is far more sweeping than that required to fix the problem. The best way to avoid the risk of overkill is for the profession to put its own house in order where there are justifiable reasons for concern and to educate the public in the areas where it suffers from significant misconceptions. We are struggling mightily to do both those things.

We have done little to free our patients from commonly held misconceptions surrounding medicine in general and our system in particular. The idea of a health care delivery system that is instantly available, personalized, one class and first class, free or low cost to the individual, and economically feasible for the government is beyond the realm of contemporary reality. The challenge to us is to adjust our system so that it will give the Navy and Marine Corps as much of the best of both worlds as possible—the world of advanced science and the world of individual freedom. It goes without saying, however, that whatever adjustments we make must fall within the realm of contemporary reality. The illusion that more can be done with less is just that—an illusion.

The Chief of Naval Operations'/ Surgeon Generals' recent Health Care Conference, followed by the DOD Health Care Commanders' Conference have both underscored the fact that our leaders understand the problems that confront us. They concur that we simply cannot attempt to provide at 100 percent when we have less than 100 percent of the required resources. In the forthcoming months we are going to take the steps necessary to assure that "what we do, we do right." In consonance with and fully supported by the Surgeon General and the Chief of Naval Operations, we will do exactly that!

We have a splendid health care system and you know it. When one considers that within our Navy system there were 13 million patient interactions last year, the really small number of problem cases is especially striking. Ironically in many, if not most, of these instances it has been our own quality assurance programs that have discovered those problems. But quality assurance programs turn up $600 ashtrays. Unfortunately, it is the ashtray that gets the publicity, not the quality assurance program.

RADM Joseph S. Cassells, MC

It is a source of great pride to me that the women and men serving in the Hospital Corps, the Dental Technician rating, the Nurse Corps, Medical Service Corps, Dental Corps, and Medical Corps constitute a body of professionals second to none. You have my complete confidence. And I am further confident that together we will accomplish the goals we set for ourselves as we bring about the changes necessary to improve both the level and quality of care we provide our beneficiaries.

I plan to use this column in future months as one means of communication with you. I encourage you to read *U.S. Navy Medicine* and this column. I further encourage your participation in *U.S. Navy Medicine* through submission of articles for publication.

Researchers Dive to Beat the Bends

Every Tuesday, Wednesday, and Thursday morning in an ultramodern, white, concrete building on a tree-lined street in Bethesda, MD, 18 Navy divers are plunged to the depths of an imaginary ocean.

From the minute the volunteers enter the bulbous steel pressure chambers, their physiological responses and performance are watched, recorded, and evaluated by a bevy of Naval Medical Research Institute (NMRI) scientists and technicians of the Hyperbaric Medicine Program Center (HMPC).

Later, other divers will be taken down further and for longer periods. The man-rated hyperbaric chamber complex, in use since 1983, can simulate ocean depths below 3,000 feet of sea water.

The first dive on this rainy, spring morning is part of a decompression sickness project including a series of tests on the Navy's *avant garde* "maximum likelihood" decompression tables. These tables are based on a mathematical model and are scientifically verifiable, according to Don Chandler, deputy director of the Hyperbaric Medicine Program. Earlier tables were based largely on trial and error and gave a variable and unpredictable degree of safety from the hazard of painful decompression sickness (DCS) or "bends." Bends are thought to be caused when excess gas accumulated in the diver's tissues fails to leave the body normally during decompression and becomes trapped in a bubble.

Chandler said the old tables did not account for the individual physiological differences between divers. These differences allow one diver to come up faster than another without suffering from the bends or allow a particular diver to come up faster today than yesterday. The Navy's proposed new tables are superior because they list a percentage *likelihood* or probability for divers becoming ill at a given rate of decompression. Therefore, they allow the possibility of weighing the importance of a specific mission against the risk of a diver getting DCS.

CDR Paul K. Weathersby, 36, a chemical engineer who came to HMPC for 2 years and became so engrossed in the work that he stayed for 8, is in charge of this particular set of experiments. "We set up these dives to test whether oxygen makes any difference in decompression or not," Weathersby said.

"An assumption embedded in every decompression schedule from 1900 until now is that oxygen itself doesn't make any difference," Weathersby explained. Therefore, as long as the diver breathes the same amount of nitrogen, whether the mixture has a low or high oxygen content doesn't really matter. "If that assumption is correct then the low oxygen/high oxygen dives here will be equally safe," Weathersby said.

However, there are theoretical physiological reasons to think the oxygen may count for or against a diver getting the bends. "Because we don't know enough about the mechanism of

Brown suits up for the dive.

decompression sickness, and have no way of measuring its incidence short of the full set of symptoms, the only way we can find out is to do provocative but controlled decompression experiments on people and observe the results," Weathersby concluded.

In the basement of the building, five adjoining hyperbaric chambers run the length of a crowded room about the size of a tennis court. The large, white, rounded containers are made of what Dr. Weathersby refers to as "highly pedigreed steel." The history of the steel from the time it was an ingot is recorded in great detail in volumes at the center's upstairs library.

Along one side of the room runs a series of stations where watchstanders sit, about 12 of them of various rates—signalmen, corpsmen, gunner's mates, boatswain's mates. Some sport sneakers, shorts, and tee-shirts; others are dressed in dark blue coveralls. Most wear headphones and sit before a great array of dials, levers, switches, and TV screens which enable them to control, observe, and evaluate conditions inside the chamber.

One of the chambers—R Chamber—has undergone some maintenance. Even though R Chamber will not be used for this experiment, a safety test must be run before the manned dive can take place. In 4 minutes the chamber is taken down to 300 feet.

"R Chamber's been tested out. Everything's hunky-dory!" says a voice on Channel One of the headphones. A watchstander turns handles hard for a rapid rise to the surface calling, "Two zero zero feet, one nine zero," as the chamber decompresses up to sea level.

The first two divers, BM1 (DV) David Brown, 29, and EM1 (DV) Victor Harrison, 30, are snuggly suited up in sleeveless black and blue wet suits. They duck through a large hatch to enter the interim chamber, then stoop through to D Chamber where the experiment will take place. Accompanying them are two "tenders," divers who will stay in the pressurized chamber to take care of Petty Officers Brown and Harrison as they complete their underwater tasks. Wearing breathing apparatus hooked up to the experimental gas mixture, Brown and Harrison lower themselves into the 11-foot-deep "wet pot" suspended underneath D Chamber. Conditions, such as water temperature and ability to work underwater, will be as close to real life as possible.

Divers Brown (left) and Harrison are greeted by HMCS (DV) Wayne Shurtz, senior diving medical technician, after the dive.

In constant visual and aural contact with their colleagues outside the chamber, the two divers sit on metal "sleds" equipped with pedals they push to increase their metabolic rate to the equivalent of a light-to-moderate workload.

The tenders, at 79 feet, breathe air containing 21 percent oxygen. In order to resurface without decompressing they can only stay down a maximum of 40 minutes. They therefore are replaced by two other tenders halfway through the hour-long dive. The divers in the wet pot breathe a richer oxygen mixture (35 percent oxygen) but at 88 feet can stay down longer.

The two young divers pedal or "work" 5 minutes, rest 3, work 5, rest 3, guided by a flashing white light. Scientists watch them via TV cameras or through a small porthole in the wet pot.

On the other side of the chamber sits an investigator who monitors the pressure in the chamber. Any variation from the desired pressure could invalidate the experiment and the dive would be aborted.

This is not a long dive and soon a reception committee gathers at the heavy 3-inch steel door to greet the divers. They come out red-faced and grinning. Asked if he is cold, one replies, "Aye, aye, sir!" They strip off their wet suits.

Two medical officers and a dozen divers and technicians are on hand to greet them. The two divers will not be left alone for the next several hours while they are scrutinized by their companions for telltale signs of DCS. According to Weathersby, following a recent experiment, one diver observed another holding his arm in an uncharacteristic way. He fetched a doctor who observed the same behavior. The "bent" diver was led back to the decompression chamber.

Below: *IC1 Terry Robb maintains a record of the dive.* Right: *Diving Watch Officer, LT Al Grimmig, CEC, and Diving Medical Officer, LCDR Doug Mayers, MC, study Harrison, emerging from dive, for signs of DCS. BM2 (DV) Calvin Greathouse looks on.*

Harrison and Brown must remain directly in front of the chamber for 15 minutes. For the next hour they must be accompanied by another diver wherever they go. For the hour after that, they have to remain in the building. DCS may not be evident immediately but will generally show up in the first few hours under the watchful eyes of scientists and fellow divers.

Asked why he volunteered for an experiment in which there was risk of becoming uncomfortably or even dangerously "bent," BM1 Brown expressed great confidence in Dr. Weathersby and the HMPC group. "The risks are more in the fleet than they are here," he said, referring to the extreme watchfulness of the team and the immediate treatment available at Bethesda. Besides, Brown pointed out, "the purpose of this is to make diving better for everyone, not just Navy, but for everyone."

The tests on the oxygen influence in decompression are due to be completed by the end of the year. Then HMPC will send tables based on this work to the Naval Experimental Diving Unit (NEDU) in Panama City, FL, for further testing before they are accepted for use by the fleet. □

—Diane M. LaMacchia, Public Affairs Office, Naval Medical Command, Washington, DC 20372-5120. Photos by HM1 Kenton C. Smith

Greathouse operates valves that control the depth of the chamber.

CAPT E. Stephen Amis, Jr., MC, the new commanding officer at Bethesda Naval Hospital has initiated a major incentive for academic excellence at this facility. He believes that "maintenance of our academic credibility is requisite for continuation of our fine graduate education and training program." The new skipper further noted that "increasing our academic standards will enable our staff to better care for our military beneficiaries. Academic pursuits can, and should be, complementary to operational readiness."

CAPT Amis is a scholarly physician who has published numerous papers on urologic radiology, made many scientific presentations, and has won teaching awards including the prestigious Lawrence Robbins Radiology Teaching Award at the Massachusetts General Hospital/Harvard Medical School. It's fair to say that Bethesda's academic credibility is starting at the top.

CAPT Amis has appointed CDR Bart Chernow, MC, USNR, to head the hospital's Office of Academic Affairs. CDR Chernow and his staff have already been busy putting together an academic calendar, an academic newsletter, conferences, library displays, and research programs. In this issue of U.S. Navy Medicine, *a new column called "Bethesda Consultant's Corner" is testimony to the academic pursuits of the Bethesda staff.* U.S. Navy Medicine *applauds CAPT Amis and CDR Chernow, and hopes that these two erudite physicians will lead the way to the continuation and augmentation of academic excellence at their hospital.* —Editor

Medical Evaluation of Potential Athletic Participants: A Growing Responsibility

CDR Donna R. Perry, MC, USN

Navy physicians are often asked to complete a medical statement approving a child's eligibility to participate in a local sports program. Recent medical-legal opinions have found most sports physicals to be grossly inadequate because many are cursory examinations performed by busy primary care providers without appropriate guidelines. The responsibility is on Navy primary care providers to acquire the skills and appropriate referral sources to provide young persons with the opportunity to participate safely in athletics.

Dr. Perry is director of adolescent medicine, Department of Pediatrics, Naval Hospital, Bethesda, MD 20814-5011.

An estimated 60-65 percent of all boys and 45-50 percent of all girls participate in community and school-organized sports. The level of training and competition has increased dramatically over the last decade. Injuries of sufficient severity to impair athletic participation even transiently occurs in boys' sports at a rate of 39/100 participants per year, and in girls' sports at a rate of 22/100 participants per year. The rate is sport-dependent with football and wrestling having the highest injury rates at 75-81 injuries per 100 participants per year. Approximately 25 percent of these injuries are secondary to previous unrehabilitated injuries. Allowing an athlete onto the playing field before he/she is ready could make the physician legally responsible for that injury.

Strength-training or weight-training has become popular as a conditioning tool for many athletes. However, few young people have been appropriately instructed on how to develop a personalized program, and some are encouraged by well-meaning, but misinformed, coaches to do potentially hazardous lifts. Guidelines for strength training are available through the American Academy of Pediatrics' Committee on Sports Medicine, (141 Northwest Point Road, P.O. Box 927, Elk Grove Village, IL 60007) or through the American College of Sports Medicine (401 West Michigan Street, Indianapolis, IN 46202).

TABLE 1

HEALTH EXAMINATION RECORD—EMPLOYMENT/SCHOOL/SPORTS

NHBETH(48) 6120/80 (5-84)

DATE

PEDIATRIC APPOINTMENT CLINIC

PART I - MEDICAL HISTORY	Yes	No
1. Have any members of your family under age 50 had a "heart attack" or sudden unexplained death?		
2. Have you ever passed out while running or exercising?		
3. Do you have to stop while running about ½ mile?		
4. Are you taking any medication? (include regular aspirin or antacid)		
5. Have you been "knocked out" had a concussion, or had severe pain in neck or arms?		
6. Have you sprained, strained, dislocated, broken, or had severe pain in head, arms, back, legs, neck? (Circle)		

	Yes	No
7. Are you currently involved in a weight training or strengthening program? Is so, describe, including who is supervising it. (use back of page)		
8. At what age did you begin your menstrual period? _____ If you have not started or do not have any questions please mark "No".		
9. Physical instruction sheet was reviewed with patient at time of examination.		

COMMENTS:

PART II - ILLNESS AND APPROXIMATE DATE

If "Yes" is checked, add approximate date(s)

	Yes	No	Date
Hospitalization			
Asthma			
Allergy			
Operations			
Injury			
Kidney trouble			
Heart trouble			
Rheumatic fever			
Convulsions			
TB			
Diabetes			
Head injury			
Other illness (specify)			

FAMILY HISTORY	Yes	No	Date
Intact family			
Divorce			
Remarried			
Parental death			
Sibling death			
Parent or sibling hospitalization			

PART III - IMMUNIZATION DATE

Measles _____

Mumps _____

Rubella _____

Polio _____

DPT/dt _____

TB Test _____

Was examined and found to be in satisfactory health and free from communicable disease. Yes ☐ No ☐

MAY PARTICIPATE IN:

Regular scholastic program _____

Hiking, camping _____

Employment _____

Restriction (see attachment) _____

Varsity athletics

(Wt. loss permitted) _____ lbs. _____

PURPOSE OF EXAMINATION:

PART IV - PHYSICAL EXAMINATION

	NORMAL Yes	NORMAL No	ABNORMAL IF:
Height _____ % _____			
Weight _____ % _____			
Pulse _____			
BP _____/_____ % _____			≥ 90th% for age
Vision: Right 20/_____ Left 20/_____ Glasses or Contact lenses			≥ 20/200, corrected Be sure safety glasses used
Hearing: Right _____ Left _____			
Urinalysis: Glucose: _____ Albumin _____ Blood: _____			Any are positive
Hemoglobin: _____ MCV: _____ FEP _____			10% for age
Skin: _____			Pustular acne, herpes, impetigo Athlete's foot
Eyes, Ears, Nose: _____			
Mouth: _____			Carries, single false tooth, mouth appliance worn during games (contact sports)
Lungs: _____			Wheezes, adventitious sounds
Heart: _____			Murmur, click/murmur
Abdomen: _____			Organomegaly
Genitalia: (Tanner stage) _____			Less than Tanner 3 for contact or collision; both testes not descended.
Hernia: _____			
Spine: _____			Scoliosis 15° or marked lumbar lordosi
SPORTS PHYSICAL ORTHOPEDIC EXAM			
Body symmetry: _____			
Cervical spine motion: _____			Less than full range of motion
Trapezius strength: _____			
Shoulder abduction against resistance _____			No or unequal strength
Upper body flexibility (score)			(0=tight, 6=loose) Male: <1.5 or >3.5 Female: <2.0 or >4.0
External rotation of shoulder _____			
Elbow extension _____			
Wrist rotation _____			
Finger spread ± resistance			
Grip strength and symmetry			
Lower body flexibility (score each)			(0=tight, 10=loose, total) Male: <3.0 or >5.5 Female: <4.5 or >7.0
Bend at waist, hands to floor _____			
Knee hyperextension _____			
Toe in: _____			
Toe out: _____			
Groin stretch (lotus) _____			
Knee Stability:			
Collateral ligaments			
Cruciate ligaments (drawer sign)			
Meniscus			
Patellar apprehension and crepitance			
Duck walk four steps			
Raise on toes, toe walk			
Back on heels, heel walk			
Tandem gait			
Achilles stretch			Plantar Flexion and ≥ 90°

FOLLOW-UP INSTRUCTIONS/COMMENTS:

HOME PHONE: | WORK PHONE:

STAFF PEDIATRICIAN

– PATIENT IDENTIFICATION –

GPO 907-672

Pre-Sport Medical Evaluation

For young athletes, a good pre-sports screening examination should identify any medical problems that might preclude safe participation. As athletes age, this screen should identify injuries that might impair performance or require rehabilitation before safe competition.

As with most of medicine, the medical history is the most useful portion of the pre-sport evaluation. A traditional past medical history should be broadened to include specific questions about familial heart disease or sudden death of immediate family members before the age of 50, exercise-induced chest pain, syncope, or dyspnea (Table 1). Positive answers to these questions should precipitate a more extensive cardiopulmonary evaluation (Table 2). Hypertrophic cardiomyopathy and arrhythmias are the most common causes of the rare fatalities in athletics. Exercise-induced bronchospasm may account for some of the symptoms. A recent report showed 11.2 percent of all athletes in the Twenty-third Olympiad suffered from exercise-induced bronchospasm for which they were treated.

A history of previous injuries helps to focus the orthopedic portion of the examination. A history of multiple head injuries with concussion should lead the physician to recommend against participation in contact sports (Table 3).

Verification of immunization status is required by most States and many organizations as part of the sports physical. Recent epidemics of measles in colleges should alert care providers to review carefully the age at which the child was immunized against measles. Tetanus shots need updating in the high school years. Tuberculosis screening remains important in consideration of the mobility of military families.

The physical examination itself should address four major areas:

- A general health evaluation which includes a determination of blood pressure, hemoglobin concentration, urinalysis, visual acuity, and cardiovascular status,
- Level of physical maturation (Tanner scale),
- Symmetry, strength, stability, and flexibility of extremities; and,
- Sports-specific considerations.

Population studies of blood pressure show that young people who have 90th percentile blood pressures (i.e., hypertension) are more likely to have sustained high pressures as adults. Isometric exercises such as weight-lifting, wrestling, gymnastics, archery, and playing the line in football can have an

TABLE 2. Cardiac Findings That Require Referral

History

1. Chest pain and shortness of breath while running/exercising if not associated with exercise-induced bronchospasm
2. Syncope while running, exercising, or performing isometric exercise such as weight-lifting
3. Family history of heart attack or sudden death before age 50

Physical examination

1. All systolic clicks
2. Systolic murmurs at the apex and upper left sternal border that are not abolished with valsalva; standing will increase prolapse
3. All diastolic murmurs
4. Blood pressure at or above the 90th percentile for age (or equivalent Tanner stage); any blood pressure greater than 140/90, when taken with the appropriate size cuff

TABLE 3. Classification of Concussion

Concussion: Transient impairment of cerebral function

	First Degree	Second Degree	Third Degree
Unconsciousness	None	3-4 minutes	5 minutes
Confusion	Slight	Momentary	5 minutes
Memory Loss	None	Mild	Prolonged
Dizziness	Mild	Moderate	Severe
Recovery	Rapid	5 minutes	5 minutes

Only FIRST degree injuries are allowed to continue to play in that game.

Two third degree concussions in one season, out of contact sports for the season.

If 3 concussions (third degree) in life, should not be in collision and probably not in contact.

adverse effect on those with high blood pressure. There are several absolute contraindications to sports participation (Table 4). Some special problems may require referral for further evaluation by the primary care provider (Table 5).

Proper nutrition is important in the young athlete who is rapidly growing, especially in sports which require weight restrictions. Anemia can be as high as 40 percent in females and 15-20 percent in males of adolescent age. Hemoglobin normal value should be evaluated relative to the patient's level of physical maturation rather than age.

The level of physical maturity has implications when advising the athlete about participating in contact sports. Girls and boys grow at different times within their pubertal development. Varsity level contact sports should not be allowed until adequate muscle mass develops which usually occurs about halfway through pubertal growth.

The orthopedic examination is the most important part of the sports physical in an otherwise healthy young person. Symmetry of structure, strength, and flexibility are necessary to avoid "overuse" injuries in early training. Athletes competing in sports using more sprint movement tend to be more muscular then endurance athletes. Swimmers require good shoulder strength and flexibility; if doing the breaststroke, they are especially susceptible to patellar pain or "swimmer's knee." Basketball players are notorious for ankle injuries and resulting weakness, and for knee problems. The bulkier athletes such as football players who have thick, strong muscles but neglect flexibility, cannot absorb the shock of heavy contact. Especially vulnerable are hamstrings and groin muscles.

TABLE 4. Absolute Contraindications to Contact Sports

- Absence of vision or uncorrectable vision in one eye
- History of detached retina
- Enlarged spleen or liver associated with systemic disease
- Absent kidney or testicle
- Ehlers-Danlos or Marfan Syndrome
- Post-traumatic convulsive disorders
- Vertebral defects that endanger the spinal cord or nerve roots (Radiculopathy due to vertebral compression of dorsal nerve roots)
- Multiple concussions (more than three per season or head injuries that demonstrate residual symptoms, neurological changes, or evidence of altered activity on EEG)

TABLE 5. Referral for Further Evaluation

- Acne that is bothersome to the patient
- Menstrual irregularities, dysmenorrhea that is dyfunctional (these may be referred to Adolescent Clinic)
- Patients with any chronic illness who does not have a primary care provider; especially asthmatics, diabetics, and those with renal or neurological problems
- Wrestlers who wish to have percent body fats measured and should have dietary counseling

An On-Going Program

An organized approach to the presport examination can make it possible to evaluate properly a large number of patients. The Division of Adolescent Medicine in the Department of Pediatrics, with the assistance of the Department of Internal Medicine, has developed a system at Naval Hospital, Bethesda in which over 900 dependents have been served each summer for the last 2 years. All members of both departments participate in the screening examinations with appropriate followup for those not passing with "flying colors."

We have updated the health care, uncovered health problems, provided counseling about good training techniques, and provided many teenagers with a positive experience with the health care delivery system. Of assistance have been a number of patient education handouts covering common medical and athletic problems including strength and flexibility training. Both the medical-legal climate and the level of participation of young people require that Navy primary care providers take this responsibility seriously.

More detailed information including a provider education packet, forms, and/or videotapes is available by contacting the author.

Bibliography

Daniel WA, Brown RT, *J Curr Adolesc Med* 1:5, 1979.

Galioto FM: Cardiac evaluation of the child and adolescent for athletics. *J Sch Health,* April 1979, pp 220-222.

Harvey J: The preparticipation examination of the child athlete. *Clin Sports Med* 1(3):353-369, 1982.

Kreipe RE, Gewanter HL: Physical maturity screening for participation in sports. *Pediatrics* 75(6):1076-1080, 1985.

Preparticipation Health Evaluation, Sports Medicine. *Health Care for Young Athletes,* American Academy of Pediatrics, 1983.

Tanner JM: *Growth at Adolescence.* Oxford, Blackwell, 1962. □

Credibility in Operational Medicine

LCDR Jerry M. Linenger, (FS) MC, USN

Ratchet wrenches crank click, click, click until the roar of a passing jet engine consumes all sound. The smell of overcooked French fries leaks from the Flight Liner Diner to combine with the nauseating fumes of jet exhaust. A pilot, coughing, stands outside the door marked "Flight Planning," squinting to focus on the digits of his Hong Kong Special Watch-Calculator. The seasoned squadron flight surgeon, cracked-leather flight jacket collar upturned, blends unobtrusively into the hangar surroundings, taking it all in.

Two short years ago he felt awkward and misplaced, not blending in at all. Though dressed in the appropriate drab-green flight suit with dog tags jingling around his neck, you couldn't help but envision him in sparkling whites with a stethescope replacing the tags. The flight boots were too shiny, too smooth; they lacked the typically gouged toes associated with kicking rudder pedals and the thin oily film acquired from leaking hydraulic fluids. His posture appeared too rigid, his eyes too wide-open, and his vocabulary too "ordinary"—absent was the typical aviator drawl and slang (Folks, we have a little 'bitty problem up-e-here in the cockpit—ya'll just relax a few mo' minutes . . . .). He couldn't understand the lingo, the

Dr. Linenger is assistant force medical officer, Commander Naval Air Force Pacific, stationed at NAS North Island, San Diego, CA 92135.

equipment, and worst of all, the personnel with their odd aviator unique ways. And quite honestly, the aircraft with turning turbines, sucking intakes, and thunderous engines, scared the hell out of him.

True, his new squadronmates were typically aviator-friendly, yet no one was willing to get too close, confide too much, or discuss too many medical problems with him. He could sense he was viewed as an outsider.

Yet, there he was a salty 2 years later in his now oil-stained, squadron patch-decorated flight suit, chewing the fat with his squadronmates. The bond was there; he had gained their trust, confidence, and respect. He wore his wings as proudly and as naturally as any aviator in the crowd. He was *their* Doc. If any medical problem arose, it was him and only him that they'd place their trust in, risk their livelihood and love of flying to. He was now doing his job superbly.

Quality operational medicine requires more than the usual medical qualifications of knowledge, empathy, skillful hands, and an analytical mind. True, the skills gleaned from in-house training stood him in good stead in the hospital setting. Yet in the real military world of screaming jet engines, yankin' and bankin', and oil-stained T-shirts, hospital-acquired skills alone are not enough. Those skills are too isolated and uninvolved.

True success in the operational military medicine arena requires a fifth ingredient—credibility, military credibility. Without it, the hospital-acquired skills are underutilized, never incorporated in a timely manner, and never sought until "after the fact." (After the aircraft mishap, after the myocardial infarction, in short, *after* the point where intervention could preserve millions of dollars in military equipment and functioning aviators.) The surgeon who during the consent-signing procedure trips over the carpet upon entering the room, drops a pen, and then the consent form itself—ends up with an unsigned form. The overweight dietician draws glances of disbelief when explaining the prescribed weight-reducing diet to an obese patient. And no matter how skillful, how knowledgeable, and how caring the flight surgeon (or any other operational medical officer), if he lacks military credibility his people won't trust their dog to him.

The flight surgeon who remains an "outsider" to the squadron is, therefore, like a computer without a keyboard. The capability to perform is there, but it can't be tapped or utilized effectively. Without full integration into the patients' world—with ready rooms replacing medical conference rooms and the cockpit replacing the operating table—he remains an ineffective outsider.

Once acclimatized, the ability to recognize a faltering pilot *before* a costly accident, to detect occupational hazards and safety violations during a routine stroll through the hangar, and to influence squadronmates toward healthy lifestyles before physical breakdown, becomes second-nature. Once fully integrated into the operational oriented military setting, the competent medical officer can make significant, timely contributions toward the health maintenance of all his people.

The modern aircraft carrier is the domain of the flight surgeon.

way. The sterile smell of disinfectants eminates from behind the door marked "O.R." A surgeon, mask dangling from his neck, leans back in his chair, rubs his sleep-laden eyes, and completes the post-op dictation. The very familiarity of the scene is comforting; we feel at ease, at home in the surroundings.

By the same token, becoming comfortable in the operational military setting and being at ease with the working active duty patient requires immersion into their world, firsthand experience, and suffering their frustrations as they feel them. Sweat-stained flight suit, sunburned face, weary eyes after a long flight. Only after becoming "their Doc" can you do your job superbly. □

To be sure, my focus has been on the aviation community, my operational specialty, and where I feel most at home. Yet the concept applies across the board. Military credibility is a prerequisite to success in any operational setting. Working with the Seabees? Drive the bulldozer! The Marines? Shoot an M-16! Shipboard? Stand a bridgewatch. Become OOD-underway qualified. Become involved in your patients' livelihood in order to better understand them. Gain their trust and thereby provide better care for them.

The rhythmic pump, pump, pumping sound of respirators fill the hall-

Ready to go: An F/A-18 prepares to be catapulted off the deck.

Microcomputer Database Management Systems

ENS Joseph L. Bemrich, MSC, USNR

The introduction of the microcomputer into the Navy Medical Department has provided a new set of tools for effective medical care administration. In view of the proliferation of programs which require periodic examination or treatment of various subsets of the patient population, the combination of the microcomputer and the database management system may well prove to be the most important administrative tool available to health care administrators for the foreseeable future. However, the effective use of these "user-friendly" packages still requires the knowledge of basic database principles.

The role of Medical Department personnel today has taken a significant turn from what it has been in the past. While the old saw "The job's not finished until the paperwork's done" still rings true, it seems as if there has never been so much paperwork to be done. And that's not to say that the patient care and preventive medicine aspects of the job have become less significant. It is the increase in recordkeeping requirements for various occupational health programs and the increasing emphasis on workload and productivity data to feed the DOD Planning, Programming, and Budgeting System that have been the major sources of new paperwork.

The effective manager must be willing to look into new methods of improving the efficiency of his staff. The independent duty hospital corpsman needs a way to cope with ever-increasing paperwork and still have time to practice medicine. They both need a better way to keep track of requirements for periodic reports, immunizations, examinations, inspections and surveys, and all the other activities that are not immediately crucial to health care but must be done in order to keep the system going and resources flowing.

Microcomputer software development has finally reached the stage where almost anyone can make productive use of them with a relatively small investment in procurement money and training time. There are several excellent database management systems on the market which a novice can learn to use to automate everything from tickler files to complex reporting systems. While the documentation that comes with any one of these packages generally does an adequate job of describing the syntax needed to build, load, and query a database, there are a few fundamental concepts that, if taken into account during the design phase, go a long way toward making a database more useful to the user.

Components of a Database Management System

Every good database management system (as distinguished from file managers, which are not nearly so useful) has three major components. The data definition language is used to define the various items (or fields) that make up each record in the files and is also used to describe the relationships between the fields and records. The data manipulation language is used to make changes to the data in the database files. The query language, as the name suggests, provides a means of asking questions, generating reports, and otherwise getting information from the system.

Current microcomputer database management systems employ the relational, or table-oriented model, first described by Edgar Codd in the early seventies.(*1*) The fundamental concept of this system is the storage of data in tabular form, with a specific set of "relational operators" used to manipulate the tables as needed by the user. Each column in the table represents a particular field in the record, and each row represents a record.

Through the use of the relational operators, one can add or remove fields from the records, join all or parts of separate files to form new ones, create new files containing only specified records from the original file, and even check one file against another for records that have matching values in their common fields or have no matches.

The query languages with these packages allow one to look at all or part of a database file and generate reports based upon the value of any field (or combinations of fields) in the record. These techniques are presented in the following example, in which we shall build a garden variety medical tickler file. The commands used are generic in nature. Most microcomputer database packages use these commands (although the exact wording may vary).

ENS Bemrich is assigned to the Naval Medical Data Services Center, Bethesda, MD 20814-5066.

```
DEFINE TICKLER        (TICKLER is the database name)
(Entering database definition mode)

ATTRIBUTES            (Define the field name, type, and length)

PATIENT ALPHA 25
RANK ALPHA 6
SSAN ALPHA 9 INDEX          (ALPHA DUE TO LEADING ZEROES IN SSANS)
DIVISION ALPHA 3
PRD DATE                    (THIS IS HANDY FOR CLEARING FILES)
EAOS ALPHA                  (FOR SCHEDULING P.E.'S)
BLOOD  ALPHA 2
TYPHOID DATE          (DATE FORMAT IS FIXED LENGTH)
SMLPOX DATE
TETANUS DATE
YFEVER DATE
PPD DATE
ASBESTOS DATE
DENTAL DATE
PHYSICAL DATE
ALLERGIES ALPHA 15          (TO PRESCREEN IMMUNIZATION QUERIES)

RELATIONS TICKLER WITH NAME RANK SSAN DIVISION PRD EAOR +
          BLOOD TYPHOID SMLPOX TETANUS YFEVER PPD ASBESTOS +
          DENTAL PHYSICAL ALLERGIES.
```

Figure 1. Medical Record Database (Comments in Paretheses)

Creating a Database

First we tell the system that we wish to define a database, then that we are defining fields, then records (or relations, as they are called). See Figure 1. Note that, for each field, we give a data type. Some packages provide only the ability to make a field "numeric" or "character." Others allow "date," or "time," and allow you to change the format of the data fields. When provided, this "data-typing" facility helps reduce data entry errors, as the system will not allow characters to be entered into numeric fields. If a date format is specified it will accept only that format. Some packages even check for correct month/year/day formats. Then we enter the maximum expected length of the field. After all the fields have been defined we then list each of the files we wish to define, usually by typing in the name of the files followed by the names of the fields included in the file.

Once this is completed we are ready to load data into the database. This is done using a command usually called "load" or "enter" or "append." Most packages provide a standard screen form that give the user the names of the fields and show how many characters can be entered. The best packages go farther, allowing the user to design custom screen forms. One can place prompts and reminders on the screen to help the data entry person get the job done more efficiently (Figure 2). This is important, as without this facility, one may have to use more than one screen to enter a single long record or may not be able to change an erroneously entered field without leaving the data entry mode and going into the edit mode. With a screen form one can usually move the cursor between the fields of the record until all is correct, then press a key to cause the record to be written to the file.

Once the data is in the file, the fun begins. The query languages of the relational database system provide an incredible power and flexibility that traditional programming techniques simply cannot give an end-user. When combined with report-writing modules that write reports based upon the query results, a great deal of work is saved for each query done.

Now, in our example, let's say we wish to print a report showing all the persons in the command who require typhoid immunizations during the

MEDICAL RECORD DATA ENTRY

NAME: RANK: SSAN:

DIVISION: PRD: EAOS: BLOOD TYPE:

BLOOD TYPE: TYPHOID: SMLPOX:

TETANUS: PPD: DENTAL DUE:

PHYSICAL: ALLERGIES:

Figure 2. Example Medical Database Data Entry Screen

month of June. Further, we also wish to list those requiring PPD's and asbestos exams on the same report, so as to save time. To do this (again the exact syntax varies with the vendor) we simply give the command: "PRINT EXAMLIST WHE TYPHOID EQ 06/85 OR PPD EQ 06/85 OR ASBESTOS EQ 06/85." The system will search the database for the records we want and then print the report that was previously formatted, listing just the records from the file that we have directed to be placed into the report. This ability to choose selectively fields/records to be printed allows us to send to the man's division officer a roster that contains only the name, division, and social security number. Yet by changing the report name in the command, we can print a report for internal use showing what procedures are required for each person (Figures 3 and 4). If desired, the report can be sorted by any field in the record, in contrast to traditional systems, where the sort fields are predefined by the original design specifications and are not changeable by the user.

The flexibility of this "WHERE" (or "FOR") clause is the heart of the system. With this clause, for example, personnel at the Navy Environmental Health Center (NEHC) routinely query the Disease Alert Report Database with questions such as "How many active duty medical personnel were reported from the Western Pacific area with viral hepatitis during the first 6 months of 1984?" And it is accomplished with one command:

DISPLAY ALL FROM DAR WHE STATUS EQ O AND OP-AREA > 600 AND DONSET > 84/01/01 AND DONSET < 84/06/01 AND ICDA EQ 70.3

The ability to do this at the speed of a computer is what makes this technology a real prize. It took NEHC's micro system about 90 seconds to screen 1,800 records and give an answer.

There are side benefits for the MDR other than creating lists of examinations or immunizations due. By using a command called "TALLY" in some packages, one can get a count of exams due in any given period, thus getting a very close estimate of vaccine, forms, audiogram cards, etc., that will be required. This can help to plan and minimize the amount of one's OPTAR sitting in the supply room. In large commands, tallies of hepatitis cases or new PPD reactors may reveal previously unnoticed index cases. The machine's speed makes practical those tasks that manually would have required too much time.

The use of relational operators such as "PROJECT" which create new files by using all or some of the fields of an existing file, and JOIN, which links two files together, can add or subtract

MEDICAL DEPARTMENT
USS *NEVERPORT* (CVN-99)

From: Medical Officer
To: Division Officer

Subj: Medical exams/immunization notice

1. The following personnel from your division require immunizations or periodic examinations this month. Please have these personnel report as soon as possible.

NAME	RANK/RATE
BAKER, JOHN	BT2
CARDERSON, ALAN	FN
DRILLING, WILLIAM	EN3
ELDER, HARVEY	HT1

B.Z. BEE
CDR, MC, USN

Figure 3. Report From Medical Database (for Distribution)

fields from the records without having to start all over again. With traditional programming techniques, adding or subtracting a field means rewriting part or all the programs that use it. In a relational database management system it's a relatively uncomplicated task, requiring only that there be fields in each file that have unique values for each record (keys).

Design Factors to Consider

As one may surmise, the key to using effectively the power of the relational database system is to have the right data in the file. Any list manager program will store and retrieve a haphazard collection of data items and will list them in a reasonably well-formatted manner. But to make the best use of the database manager, some care must be given to deciding what fields to keep in the database. Obviously, if you need to search for or sort records based upon a given attribute of a record, you must include that attribute in the file. Perhaps you may wish to calculate a value based upon other values in the record, such as we do for an annual TB screening report summaries. If your package will not allow you to calculate that value and print it out when generating reports, you must leave a blank field in the record so that you can assign a formula to it when the value is needed.

Problems inevitably arise with updates to records. UIC's change, homeports are moved, personnel change divisions. Keeping this up to date can be a problem if the same data is kept in several files. For example, if the command name "Naval Hospital, Bethesda" always implies UIC "00498A," then rather than keeping both items in two different files, one should keep the UIC in the two files, and maintain a third file in which the name of the command and the UIC are kept. Then when a UIC changes, one adds a record to the reference file so that one can look up both the new or the old UIC when needed. This eliminates the need to change the old UIC to the new one in all the files in which it may be used. Similarly, when a field consists of a long name which can be associated with a clearly defined set of codes, such as in the International Classifications of Disease (ICD-9) system, then one should think about storing the code rather than the text names. Short, concise codes are less likely to be entered in error than 15- or 20-character names. Using names, for example, one can never quite be sure (without reading each record) that you have gotten all the records with "dengue hemorrhagic fever." It's quite simple to misspell long names. They may not fit in the field length you specified, or you may not have the disk space to allow for 40-character names. It's much more reliable to use the standard numeric code and build a separate file containing the name and the code. Later, if you need to, you can JOIN the reference file to your master file based upon the value of the disease code (the "key" referred to previously). Such design precautions to minimize the chance of data entry error are critical in a system where the only records that you'll ever conveniently find again are those with a specified value.

Most packages provide facilities for "indexing" fields in a file. Indexing a file gives the system a "path" across the disk directly from record to record for each value of the indexed field. This can significantly speed search times and should be used for fields which are frequently used as the basic for queries, such as the SSAN in our medical record database. This should not mean that you can search or sort only on indexed fields, and if the owner's manual tells you that this is so, find another package.

MEDICAL DEPARTMENT
USS *NEVERPORT* (CVN-99)

Immunizations Exams Due for June 1985

NAME	RANK/RATE	PROCEDURE
BAKER, JOHN	BT2	PPD
CARDERSON, ALAN	FN	AUDIO
DRILLING, WILLIAM	EN3	TYPHOID
ELDER, HARVEY	HT1	TETANUS

Copy to:
Medical Supply

Figure 4. Report From Medical Database (for Medical Department Use)

Summary

Using microcomputers and database management systems can speed tremendously the routine work of both the MDR at sea and the medical administrator ashore. Through command of detail, it is possible to keep better track of people and programs. The packages are easy to learn and most are available on the GSA schedule. Unlike traditional computer systems these programs require no programming expertise. Careful consideration in design of the files, report requirements, and placement of keys can enable the relational operators to make the system more than an "electronic file cabinet," but truly a data management system.

Reference

1. Codd E: A relational model of data for large shared data banks. *Communications of the ACM* 13-6, Jan 1970. □

TRIFOOD: A Computerized Medical Food Service Information System

CDR Steven R. Lamar, MSC, USN
LCDR Kathleen D. Morrison, MSC, USN

Medical food service in the Armed Forces is an area of considerable magnitude requiring significant money, personnel, and subsistence. Every day approximately 4,500 employees from 109 Army/Navy/Air Force medical treatment facilities (MTF's) prepare and serve over 82,000 meals, including 30,000 patient trays. On the average, each medical food service operation prepares/serves over 200 menu items per meal from files containing over 2,000 recipes utilizing a subsistence inventory of about 450 different food and beverage items. The food cost alone is about $38,000,000 per year. Additionally, each year, clinical dietitians from medical food service departments support over 400,000 inpatient nutritional evaluations and 300,000 outpatient nutrition clinic visits.

The information management processes generated by all this require ongoing data acquisition, monitoring, evaluation, and reporting. In order to manage such a complicated system, program directors are critically dependent upon computers. Currently, there is limited data automation of medical food service operations within the services' MTF's. Given the magnitude and complexity of medical food service programs and the relative lack of automation, development of a triservice computerized medical food service information management system (TRIFOOD) has been initiated by the TRIMIS Program Office with system use planned at 22 naval hospitals.

CDR Lamar is NAVMEDCOM specialty advisor for Nutrition, Dietetics, and Medical Food Service Administration, and Navy Functional Proponent, TRIFOOD Project. LCDR Morrison is Navy representative, TRIFOOD Development Group, TRIMIS Program Office, Bethesda, MD 20814-5066.

System Management and Implementation Plan

TRIFOOD System Program Management is directed by both an executive committee (senior functional representatives from each service) and a development group (working level functional representatives from each service). A recently completed survey initiated by the TRIFOOD Executive Committee and Development Group determined that the majority of each service's food automation requirements could be met by commercially available systems. Consequently, a Request for Proposals (REP) for the commercial acquisition of a standard system has been prepared, adding military specific functions. An initial TRIFOOD prototype system will first be installed at one Army/Navy/Air Force MTF in FY86 with the Naval Hospital, Bethesda, MD, identified as the Navy TRIFOOD prototype site. The remaining sites for each service will have systems installed on a regional basis (east coast, west coast, central, European, and Pacific) with all systems to be operational by the end of FY88.

System Objectives and Capabilities

The major objectives of automation are to improve the quality of patient care services and to reduce their cost. To realize these objectives, system requirements are designed to enhance capabilities at all levels of the medical food service organization. These capabilities include:

- Availability of nutritional analysis information. This will permit a more accurate and efficient monitoring of patients' nutritional status, thereby significantly improving nutritional care.
- Improved efficiency in administration of food production, service, and inventory. This will reduce repetitious and time-consuming clerical tasks. It will also increase availability of management information required to make reliable decisions regarding cost-effective operation.
- Availability of additional time for professional activities such as planning, management, and direct patient

care. This will result from automation of routine administrative tasks associated with food production and service functions and has the potential for supporting increased workload without additional personnel requirements.

- Potential utilization of the system's nutrient data base to determine the nutritional composition of Navy meals. All this will support the nutrition education and weight control components of the Navy's Health and Physical Readiness Program.

System Functions

The TRIFOOD System consists of seven major functional modules: *nutritional analysis, menu planning, meal service management, food production control, subsistence inventory control, financial control, and management data and reporting.* Figure 1 summarizes the components of each module.

Nutritional Analysis. The nutritional analysis function will process recipe and menu nutrient composition calculations. It will support computations indicating the nutritional content of recipe and menu items required for both menu planning and patient dietary intake evaluations. Users can identify nutrients and nutritional standards, thereby allowing the processing of nutritional analysis and assessment calculations based on patient specific data. Figures 2 and 3 indicate examples of nutrient intake information which can be generated by this module.

The availability of information concerning the nutritional composition of recipes/menus/meals and the resultant ability to compute patient specific nutrient intake values will add an important new dimension to nutritional care services. The nutritional modifications required for therapeutic diet applications can be made with a significantly enhanced degree of precision. Additionally, nutritional intake values for patients needing strict dietary control can be accurately monitored and reported in the medical record to assist physicians with nutrition-related treatment decisions.

Nutritional Analysis
- Nutrient Composition of Foods/Recipes/Menus/Dietary Intake Records
- Nutritional Status Assessment of Patients

Menu Planning
- Patient and Dinning Room Menu Planning Support
- Menu Printing

Meal Service Management
- Computation of Menu Item Selection Frequencies
- Determination of Food/Recipe Service Requirements

Food Production Control
- Establishment of Food Item Production Schedules
- Determination of Recipe Ingredient Portion Requirements
- Preparation of Food Production Worksheets

Subsistence Inventory Control
- Maintenance and Updating of Subsistence Item Inventories
- Generation of Purchase and Issue Lists

Financial Control
- Cost Accounting of Menus and Recipes
- Production of Ration Cost and Workload Reports

Management Data and Reporting
- Maintenance of Reference Files for All TRIFOOD Functions
- Generation of Productivity Reports

Figure 1. TRIFOOD System Functions

Menu Planning. The menu planning function supports the creation of menu files by allowing planners to establish both dining room and patient menus in the system. It automatically identifies those menu items which can be used to meet the specific food requirements of modified diets. Frequently served items such as bread, condiments, milk, and coffee, once entered into the system, are readily available for all menus. Rotational

		Kcal	T-Pro G	T-Fat G	T-Cho G	Vit-C Mg	Vit-A IU	Iron Mg	Calc Mg
Breakfast									
.75 Slice	Whole Wheat Toast	41	1.8	0.5	8.1	Trace	Trace	0.38	16.82
2 Tsp	Jam/Jelly, Low Calorie, Smucker's	16	0.0	0.0	4.1	.1333	5	0.01	.4
14 Vol Oz	Coffee, Brewed Beverage	12	0.6	0.4	1.8	0	0	0.40	12.08
2 Tsp	Coffee Whitener Non-Dairy Powdered	21	0.2	1.4	2.1	0	8	0.05	.8617
1 Serv	Post Raisin Bran, General Foods	94	2.6	0.4	22.0	0	1,252	4.52	15.05
1 Pkg	Wheaties, General Mills	81	2.0	0.4	18.4	7.99	1,066	2.64	9.761
.25 Pkg	Sugar Substitute Sweet'n Low	1	0.0	0.0	0.2	0	0	0.00	.0037
4 Vol Oz	Lowfat Milk Fluid, 2% Fat W/A&D	61	4.1	2.3	5.9	1.159	250	0.06	148.8

Source: HVH-CWRU Nutrient Data Base, Case Western Reserve University, Cleveland, OH

Figure 2. Nutrient Analysis Summary: Detail Format

items such as entrees, desserts, and salads can also be placed automatically on the appropriate menu. Following food item entry, the menus can be printed for patient selection, dining room posting, special diet writing, tray assembly, and food production applications. Summary reports indicating information such as service frequency of specific foods in a menu cycle will also be available to the menu planner.

Meal Service Management. The meal service management function assists the user in determining census data for dining room and patient meal service as well as indicating menu item selection percentages. Historical data serves as the means for forecasting menu selection percentages, thereby facilitating a more accurate calculation of serving requirements for each food item. Various reports for dining room and patient meal service are created from these data bases. Information is compiled for both patient and dining room applications and is used to evaluate planned versus actual meal service requirements. This provides a more precise forecast of requirements for successive meal periods.

Food Production Control. Food production control establishes the schedule of food item production based on menu selection requirements. Given these recipe/food item generated service needs, recipes are then automatically yield-adjusted with ingredient portions computed and printed to reflect actual service requirements. Food production worksheets and ingredient labels for recipes are also prepared. Ingredient amounts needed on a recipe specific basis for each food production period are automatically calculated and made available within the system to the subsistence inventory control module.

Subsistence Inventory Control. The subsistence inventory control module maintains food item inventory information and computes an issue list of ingredient requirements for each production period. The system routinely updates the unit count of subsistence items in inventory, accounting for both receipts and issues. Based on projected requirements, actual inventory, and preestablished reorder points, purchase lists are computer-generated.

The system supports physical inventory through the preparation of worksheets indicating the actual location of each item in inventory. Physical inventories can then be conducted using these computer-prepared forms. The system also provides a wide variety of inventory analysis data to increase the efficiency of managing inventory control procedures.

Financial Control. The financial control functions provide recipe and menu pricing for both ration cost management and a la carte meal service accounting. Subsistence items in inventory and subsistence issue and purchase lists can be costed on request. The daily, monthly, and yearly ration accounting is easily maintained and computed by the system, thereby providing a financial snapshot of subsistence related cash flow at any time. Workload and cost summary reports are also produced to assist with management decisions.

Management Data and Reporting. Management data and reporting provides the reference files for all other TRIFOOD System operations. Information created in this module includes ingredient, recipe, menu, nutrient/food composition data, and various operational parameters. These data are available for display and printing as needed. "Starter" files containing these data will be provided to each site upon system installation and will include the following information:

- Armed Forces Recipe Service,
- Food lists and corresponding stock numbers to support the recipe service, and
- Selected therapeutic menus from the Navy-Air Force Diet Manual (NAVMED P-5125) and therapeutic recipes from the three military departments.

Users will also be able to add site-specific information such as local food prices, purchase sources/vendors, and recipes/ingredients as part of this initial table and file. □

Nutrient Summary			RDA	% Cal
Kilocalories	1,791		87%	
Total Protein	71.8	g	157%	16%
Total Fat	64.2	g		32%
Total Carbohydrate	198.2	g		44%
Alcohol	24.7	g		10%
Suc/T-Cho	.0210			
Cholesterol	249	mg		
Total Polyunsat FA	8.831	g		
Total Saturated FA	19.49	g		
PUFA/SFA	.4532			
Fiber	4.836	g		
Ascorbic Acid	134.5	mg	224%	
Thiamine	1.148	mg	115%	
Niacin	17.81	mg	248%	
Riboflavin	1.625	mg	135%	
Pyridoxal B_6	1,083	ug	54%	
Vitamin B_{12}	3.246	ug	108%	
Folic Acid	.3022	mg	76%	
Biotin	15.84	ug	< A	
Pantothenic	3.099	mg	< A	
Total Vitamin A	10,624	IU	266%	
Total Tocopherol	5.845	mg	64%	
Vitamin D	101	IU	50%	
Caffeine	298.8	mg		
Iron	13.27	mg	74%	
Calcium	896.9	mg	112%	
Phosphorus	1,240	mg	155%	
Sodium	2,261	mg	A	
Potassium	3,233	mg	A	
Iodine	.0130	mg	9%	
Magnesium	211.7	mg	71%	
Chlorine	159.8	mg	< A	
Chromium	46.94	ug	< A	
Copper	.3209	mg	< A	
Manganese	2.079	mg	< A	
Selenium	.0136	mg	< A	
Zinc	7.777	mg	52%	

Source: HVH-CWRU Nutrient Data Base, Case Western Reserve University, Cleveland, OH

Figure 3. Nutrient Analysis Summary: Summary Format

Hyperbaric Medicine Program Center:
A Leader in Biomedical Diving Research

Diane M. LaMacchia

Decompression sickness (DCS), or the "bends," is the greatest limiting feature in Navy diving. Often painful and sometimes fatal, this condition is thought to be caused by the failure of excess gas to leave a diver's body tissues normally during decompression. And, according to CAPT Edward T. Flynn, MC, hyperbaric physiologist and director of the Hyperbaric Medicine Program Center (HMPC) at the Naval Medical Research Institute (NMRI) in Bethesda, MD, although DCS is curable by decompression therapy, it may never entirely be eliminated as a diving risk.

HMPC's mission is to concentrate on the long range basic biomedical research necessary to support Navy diving. Studies are chosen in response to the requirements of the Chief of Naval Operations. Because the ubiquitous DCS is a major problem for the diver, research at HMPC focuses on ways to minimize the risk of suffering from it and on ways to improve treatment.

For years divers from all over the world have relied on the Navy's decompression tables for data on how fast to surface while still avoiding getting "bent." These original tables were developed empirically over a period of about 75 years. Now HMPC has come up with a mathematical model called "maximum likelihood," a major achievement which promises to make the tables more accurate and ultimately more useful.

Ms. LaMacchia is deputy public affairs officer at the Naval Medical Command (MEDCOM-00D4-1), Washington, DC 20372-5120.

New Diving Tables

According to Dr. Charles W. Shilling, executive secretary/treasurer of the Undersea Medical Society, "The work at NMRI on decompression tables is probably the most imaginative going on anywhere."

Author of a 1935 paper on suggested changes in calculating decompression tables, 84-year-old Shilling said, "I've watched the game for a long time. Finally we're coming up with something that may be workable for the commercial diving group as well as the research divers, particularly in saturation habitat activity. I think their present theory is a good one."

Shilling added that the NMRI tables address the conflict between how decompression tables work for deep diving and how they work for more modest exposure. "There has to be consideration of the excursion situation," he said. "The NMRI tables are taking this into account."

HMPC's coup is the creation of a methodology for developing decompression tables. *Maximum likelihood* is an analysis program based on a combination of all the years of international navy diving experience plus the current scientific theories about what causes DCS. It predicts the probability of getting DCS as decompression times vary.

According to CAPT Flynn, *maximum likelihood* takes "real life data and adjusts all the unknowns of our model so that our model predicts as closely as possible to reality." Some of the unknowns are the rate at which the gas goes in and out of the body's tissues, the rate of bubble formation, and how many bubbles in a given location are required to produce symptoms of DCS.

"Once we have a model with all the unknown quantities estimated statistically," Flynn said, "we turn that around and ask the model to predict the decompression table."

CDR Paul K. Weathersby, MSC, head of HMPC's decompression branch, is responsible for work on developing this methodology. Weathersby earned his bachelor of science degree from Notre Dame University, his master's from the Massachusetts Institute of Technology, and a doctorate in chemical engineering from the University of Washington. He has been involved in studies related to DCS since he came to NMRI in 1977, and started the *maximum likelihood* project 2½ years ago.

Dr. Weathersby explained that *maximum likelihood* is a general statistical principle which "has been applied in other areas of medicine and industry but has never been applied in diving medicine before.

"We take what actually happened (data), take a proposed explanation for what happened (theory), and combine them to get a successful prediction of what happened. We measure the success of the prediction with a number called *maximum likelihood,*" Weathersby said.

In other words, "*maximum likelihood* is a single number that summarizes the best possible agreement between the predictions of the theory and what actually happened in the data," he concluded.

The data Weathersby and his colleagues are using for this project are records of known dives and known

EM1 (DV) Victor Harrison emerges from the hyperbaric chamber during oxygen partial pressure study.

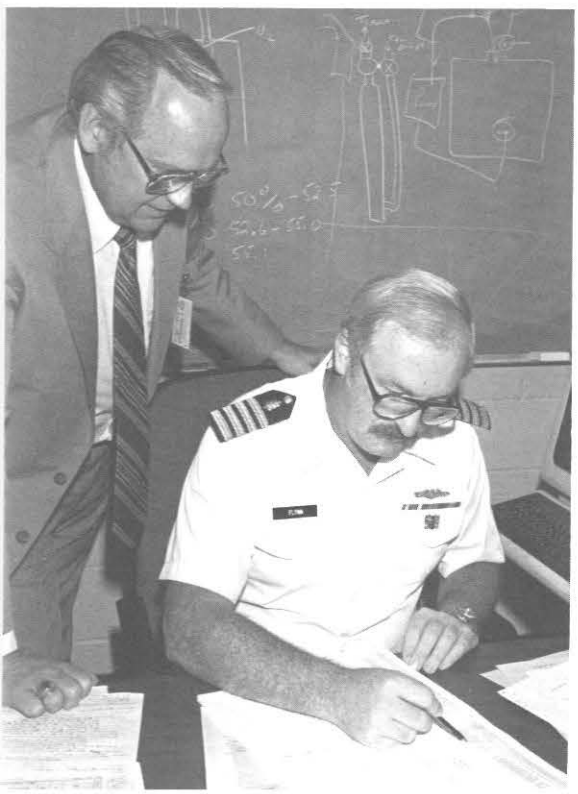
decompression outcomes. "We rifled the libraries to put together our own data bank," Weathersby recalled. His group has analyzed over 2,000 dives from all over the world dating back to 1950.

The greatest amount of data came from the Navy Experimental Diving Unit (NEDU), once located at the Navy Yard in Washington, DC. The Royal Navy Physiological Laboratory, (now known as the Admiralty Research Establishment-Physiological Laboratory) in Alverstoke, England; Canada's Defence and Civil Institute for Environmental Medicine; and the Navy's Submarine Medical Research Laboratory (SMRL) in Groton, CT, have also been valuable sources of recorded dives.

Weathersby said that depending on the availability of computer resources, he and his colleagues plan to analyze five to ten thousand more pieces of data. The first decompression table resulting from the *maximum likelihood* project was completed this summer and sent to the Naval Sea Systems Command (NAVSEASYSCOM) for evaluation.

Photos by HM1 Kenton C. Smith

CDR Weathersby standing next to "A" Chamber. Patient monitoring package in foreground.



HMPC Director CAPT Flynn (seated) and Deputy Director Chandler examine FY85 budget. Circuit diagrams for Lawrence Livermore radioactive gas inhalation experiments on blackboard.

Sophisticated Research Facility

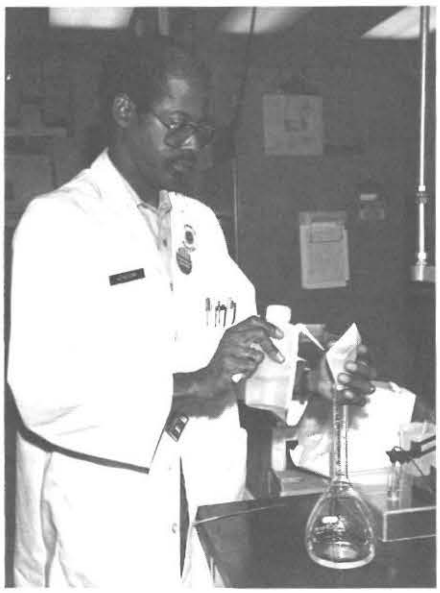
HMPC is one of five component program centers which constitute NMRI. It is located on the campus of the Naval Medical Command, National Capital Region, 10 minutes from Washington, DC, sharing ground with its more famous neighbor, the Bethesda Naval Hospital. HMPC is housed in a secure, modern, three-story building of brightly-lit laboratories, offices, and a multi-million dollar man-rated hyperbaric chamber complex.

It is, CAPT Flynn proudly says, "the best research lab in the world," featuring an array of biomedical instrumentation, a budget of $5 million per year, and a staff of "the best people around, many of them taken from disciplines other than our own." CAPT Raymond L. Sphar, MC, NMRI's commanding officer, calls it "the Navy's most sophisticated facility dedicated primarily to biomedical research." Advanced technology includes the hyperbaric chamber complex, computers, monitoring equipment such as digital oscilloscopes, Fourier analysis instruments, infrared cameras, high-powered gas chromatographs, mass spectrometers, spectrophotometers, and beta and gamma counters. Although the facility itself is only 10 years old, Flynn said, the basic physiology group working there dates back to 1944.

HMPC's parent command, NMRI, like SMRL in Groton, operates under the aegis of the Naval Medical Research and Development Command (NMRDC). HMPC is the Navy's basic long-term research and development laboratory for biomedical diving research in general, while SMRL's research and development projects are particularly related to submarines. HMPC also cooperates closely with NEDU, in Panama City, FL, which tests, evaluates, and validates diving equipment and operational procedures.

According to Deputy Director and former Navy Diving Officer Don Chandler, HMPC's core program in Bethesda is also complemented by work at Duke University, the University of Pennsylvania, and the State University of New York at Buffalo, all of which receive some funding from NMRDC. Scientists from HMPC also collaborate with their colleagues at the University of Hawaii and the University of Miami.

Scientific collaboration and cooperation extend beyond the borders of the United States. Recently, Chandler pointed out, Surg. Lt. Cdr. James Francis (RN) from the Institute of Naval Medicine in Alverstoke, Eng-



(Far left): *Hyperbaric Medicine Program Center building at NMRI, erected 1975.* (Left): *HM2 Anthony Chilton prepares a solution in the chemistry lab.*

land, arrived at HMPC in an exchange of scientists under the State Department-arranged United States/United Kingdom (U.K.) Memorandum of Understanding, administered by NMRDC. CDR Edward Thalmann, MC, a researcher from NEDU, was sent, in exchange, to Alverstoke.

HMPC also has access to NAVSEASYSCOM administered Information Exchange Programs between the U.S. and U.K. and the U.S. and Canada and to Data Exchange Agreements with the Netherlands. HMPC participates in an OPNAV-administered Data Exchange Agreement with the French Navy Diving Facility at Toulon and with the Hyperbaric Physiology Department of the University of Marseilles, France.

Informally, through the countries' respective Naval Attachés, Chandler said, HMPC researchers are in touch with scientists from Norway, Sweden, Denmark, West Germany, the Netherlands, Japan, and Australia. Visitors from the latter two countries have recently toured the Bethesda facility.

HMPC's reputation has even gone beyond the international sphere and into outer space. NASA scientists contacted CAPT Flynn for help 2 years ago when they ran into decompression problems in the space shuttle. Flynn said he offered possible solutions to avoiding DCS when astronauts' space suits kept them pressurized during extra-vehicular activities (EVA). One was to breathe oxygen for 4 hours prior to EVA; the other was to depressurize the shuttle from 14.7 pounds to a lower pressure and stay there for a few days prior to EVA.

Decompression Studies

Most of the labs at HMPC concentrate on various aspects of the prevention and treatment of DCS. Divers who do contract the bends are normally treated effectively with recompression therapy. However, according to Dr. Flynn, this therapy is not always 100 percent successful; sometimes there is permanent residual damage, such as spinal cord injury.

Of the three major categories of DCS—limb, vestibular, and spinal cord—HMPC is currently focusing on spinal cord decompression sickness in its search for alternative methods of therapy. Surg. Lt. Cdr. Francis is in charge of a study on the treatment of spinal cord DCS. In these experiments Dr. Francis and his colleagues measure the conduction of nerve impulses within the spinal cord to establish a normal response. Then they produce DCS which disrupts spinal cord transmission. For treatment they recompress and vary the absolute pressure, the oxygen partial pressure, and drugs administered to arrive at the best combination for achieving return of normal nerve responses.

One possibility for improving treatment is to determine the best recompression profile. A profile is the sequence of overpressurization, that is, the rate at which an injured diver goes to a certain pressure, how long he stays there, and the rate at which he returns. For example, a diver might be recompressed to 60 feet and stay there for a period of 4½ hours, breathing oxygen intermittently, or he might descend to 100 feet and stay there for a different length of time.

Another possibility for achieving better recompression is to try various gas mixtures, such as 100 percent oxygen, a mixture of 50 percent nitrogen and 50 percent oxygen, a mixture of helium and oxygen, or just air, 79 percent nitrogen and 21 percent oxygen.

A unique experiment, originating in the decompression studies at HMPC, is being conducted jointly at Bethesda and at the University of California's Lawrence Livermore National Laboratory in Livermore, CA. This study, headed by CDR Weathersby in conjunction with LCDR Douglas Mayers, MC, is an attempt to measure directly the rate of exchange of inert gases in the body.

"The unique thing about what we've done is to use nitrogen, which is the most common diving gas," Weathersby explained. Because radioactive nitrogen has such a short half-life, the experiment is done at Livermore where the radioactive gas is made. The goal of the experiment is to discover how two gases—radioactive nitrogen 13 and radioactive argon 41—are used in diving. Scientists measure the rate at which they enter various body regions (muscles, bones, tendons, cartilage) and the rate at which they leave. Since the gases are radioactive, their uptake

by the body can be mapped using a gamma camera.

Another inert gas study at HMPC concentrates on the decompression effects of three different gases divers breathe—helium, nitrogen, and argon. This work is headed by Dr. Richard Lillo, a Ph.D. in zoology who did his postdoctoral studies in diving physiology at the University of British Columbia in Vancouver. In these experiments, depth of dive, length of dive, the subject's weight, total pressure, and the oxygen partial pressure are all constant. The composition of the inert gas is the variable.

Lillo is also studying the effect of oxygen partial pressure on decompression outcome in conjunction with experiments Dr. Weathersby is conducting in the man-rated hyperbaric chamber complex (see "Researchers Dive to Beat the Bends," page 2). Contrary to traditional thought on the subject, Weathersby points out that there is reason to believe that oxygen pressure does make a difference in whether or not a diver gets "bent."

Oxygen is also the subject of Dr. Andrea Harabin's work. Harabin, who has a Ph.D. in pulmonary physiology, completed postdoctoral studies at Johns Hopkins University. Her group at HMPC is studying the problem of oxygen toxicity.

"Exposure to 100 percent oxygen causes lung damage under normal pressure," Harabin said. Divers treated for the bends are sometimes exposed to oxygen two and three times. Combat divers breathe 100 percent oxygen in a recirculating rig to avoid detection from bubbles. How safe are these practices?

"The main goal of this research is to detect damage so we can learn to regulate oxygen exposures," Dr. Harabin explained. Her group is examining endothelial cell function, hoping to find an early index of pulmonary oxygen toxicity. One clue to the early index may be angiotensin converting enzyme activity, which is affected much sooner than other physiological variables after exposure to oxygen.

A study headed by CAPT Phillip Catron, MC, is also concerned with divers' lungs. Dr. Catron is board certified in internal medicine, has been an undersea medical officer for 9 years, and has been at HMPC for 7. His postdoctoral work was in pulmonary medicine.

Catron found that there is an abnormal accumulation of fluid in the lung or pulmonary edema, following DCS. "Now we're doing experiments to see what the mechanisms of its production are." His group is examining the role of white blood cells in this syndrome, commonly known as the "chokes."

The effects of decompression are only part of HMPC's agenda. Other research includes an extensive investigation of high frequency ventilation, used in clinical medicine for bronchopleural fistula. To understand the fundamental defect in high pressure neurological syndrome (the most important limitation to diving deeper than 1,000 feet), a study is being conducted of the uptake of radioactive calcium by the nerve endings at high pressure. Cardiovascular responses to diving, such as heart rate and muscular fatigue, are also being investigated.

HMPC scientists do not do research on hyperbaric oxygen treatment, but they do administer clinical treatments prescribed by physicians at the Bethesda Naval Hospital. Patients with radiation necrosis, osteomyelitis, compromised skin flaps, gas embolism, and carbon monoxide poisoning have been treated at the facility. HMPC also provides a 24-hour treatment and medical consultation service for DCS and cerebral air embolism.

Dr. Harabin, who has been at HMPC for nearly 5 years, values working at the center, "because we do both basic and applied research. The facilities, people, and support we get are tremendous." And, she added, when questions are asked, "someone is really interested in the answer." □

Dr. Andrea Harabin calibrates a blood gas analyzer in her laboratory.

Key Factors in the Prevention of Suicide Among Naval Personnel

LCDR John J. Penkunas, MSC, USN

Recently the problem of suicide has been addressed in a joint letter from Commander, Military Personnel Command and Commander, Naval Medical Command.(*1*) The letter focused on the need to decrease the incidence of suicide and self-inflicted injuries among naval personnel. One proposed method of preventing suicide was to enlighten frontline caregivers—such as chaplains, counselors at the Family Services Center (FSC), Joint Drug and Alcohol Center (JDAC), and Counseling and Assistance Center (CAAC)—about the factors associated with self-destructive behavior.

This paper describes a psychologist's efforts to comply with the recognized need to prevent suicides by instructing caregivers on how to be more aware to the "cries for help" so that an immediate evaluation of the service member's suicidal potential could be effected by a mental health professional or medical officer.

Providing Information About Suicide

Since the above-mentioned caregivers are usually the first persons to be contacted by service members experiencing interpersonal, financial, occupational, or substance abuse problems, the author provided lectures and consultations so that the caregivers would be sensitive to the signals such individuals might send prior to harming or killing themselves. To insure that the nonmedical caregivers would be attuned to the distressed service member's "cries for help," it was necessary to desensitize the caregivers to the threatening topic of suicide by providing general information as well as clinical case material.

As an introduction to the presentation, current data were cited which indicated that among young persons (ages 15-24 years) the suicide rate has tripled since 1955.(*2*) At present, suicide is at least the third highest cause of death among young persons. Moreover, the crude rate for suicide is most likely to be severely underestimated because the social stigma attached to self-destructive behavior often prevents medical and law enforcement officials from listing the actual cause of death in many cases of suicide.

After having apprised the caregivers about the magnitude of the problem, some of the misconceptions(*3*) about suicide that might prevent caregivers from referring a distressed service member for an evaluation by a medical officer were presented:

- **Individuals who talk about suicide rarely commit suicide.** On the contrary, all verbal threats or hints of suicidal intent must be taken seriously, and service members making such statements must be referred to the nearest medical facility for evaluation in accordance with NAVMEDCOMINST 6520.1.(*4*)
- **The suicidal service member wants to die and feels there is no turning back.** In order to reduce the caregivers feelings of helplessness, cases were cited wherein service members have telephoned the hospital for help after they had written suicidal notes and had ingested a potentially lethal combination of drugs and alcohol. That such individuals had mixed feelings about suicide was strongly underscored so that whenever the caregivers encountered suicidal ideation or behavior they would be hopeful about being able to "hook" the part of the individual that wanted to live.
- **There is a very weak relationship between alcoholism and suicide.** It was emphasized that alcoholics have a higher rate of suicide than nonalcoholics, probably because alcoholics usually consume alcohol in order to escape internal or external stressors, and suicide is the ultimate form of escape. In other words, if an individual has used alcohol as an escape mechanism in order to cope with the inherent

Dr. Penkunas is senior psychologist in the Department of Psychiatry, Naval Hospital, Jacksonville, FL 32214.

difficulties of daily living, he is more likely to choose suicide when his usual means of escaping via alcohol becomes ineffective. Moreover, a person who abuses alcohol might be treating himself for a major psychiatric disorder from which he might try to escape when alcohol fails to control the symptoms. Likewise, a person who abuses alcohol is a high risk for suicide because alcohol impairs judgment and reduces impulse control.

• **If you ask a service member directly, "Do you feel like killing yourself?," this will lead him to make a suicide attempt.** Clinical observations indicate that distressed individuals often experienced a reduction in anxiety when they were asked directly about their suicidal intent. The caregivers were encouraged to listen to the service member's presenting problems, empathize with his difficult situation, and to ask about the means by which he has been coping. After obtaining that information, the caregivers were instructed to inquire whether the service member entertained any suicidal thinking and intent.

Information that was beneficial in enlightening caregivers about some of the psychosocial factors associated with acts of self-destruction included two studies(*5,6*) about attempted and effected suicides among different military populations. In reviewing the data on 175 Army personnel who killed themselves during 1979 and 1980, it was emphasized that only a small percentage (7.9 percent) was suffering from a major psychiatric disorder. Most of the Army personnel had been experiencing interpersonal, occupational, financial, or alcohol abuse problems for which they might have contacted one or more of the caregivers rather than having sought psychiatric treatment. Since 74.2 percent of the suicide victims had difficulties with loved ones at the time of their deaths, it was highly probable that they would have consulted with a chaplain or FSC counselor if they had sought any assistance at all. In presenting this data a strong effort was made to help the caregivers view their positions as being the frontline of defense in a suicide prevention program for military personnel.

Management of Service Members Expressing Suicidal Thoughts

Several times during the lectures and consultations it was emphasized that the role of nonmedical caregivers was to be attentive to any signal of suicidal ideation or intent presented by a distressed service member. Even though the nonmedical caregivers were trained to feel comfortable in questioning distressed individuals about suicide, they were instructed to escort to the naval hospital's emergency room any service member who acknowledged any recent suicidal ideation, intent, or behavior. In order to reinforce the point that it was beyond the training level of a nonmedical caregiver to evaluate and manage the suicide potential of a service member, the high risk factors which were to be assessed only by a qualified professional were reviewed as follows.

Researchers at the Los Angeles Suicide Prevention Center(*7*) have found that an individual expressing suicidal ideation in conjunction with one or more of the following factors becomes an imminent suicidal risk:

• **Drug and alcohol abuse.** Service members who are attempting to cope with the demands of daily living by escaping through the excessive use of substances become high risks for suicide because the substances may trigger violence that could be directed at themselves or others. Furthermore, a mental health professional should determine whether the substance abuse problem is an attempt to medicate a depression or a psychotic disorder.

• **Depression.** When an individual is depressed to the extent that his future appears bleak or nonexistent and he is withdrawn or isolated, he becomes an imminent risk for suicide because he is feeling dead emotionally and the step toward physical death might not be such a daring one.

• **Disorganization and disorientation.** An individual who is experiencing these severe psychiatric symptoms cannot reason effectively or control his behavior like a person who is able to view his situation from a realistic vantage point, hence, such an individual becomes a greater risk for suicide. An especially ominous symptom is a command hallucination wherein the psychotic individual believes that he is being commanded to kill himself by some imagined individual.

• **Hostility and agitation.** Persons who are so angry that they are verbally hostile or physically agitated are considered high risks for suicide because their intense negative feelings may erupt or be provoked into action by an otherwise benign incident.

• **Multiple lethal suicide attempts.** Individuals who have attempted to kill themselves by hanging, jumping from high places, or shooting themselves become high risks because the probability is that a future attempt with one of those means will succeed.

After reviewing the high risk signs for an imminent suicide, it was reiterated that the caregivers did not possess the training or expertise to determine who might be a high risk for imminent suicide and such clinical judgments must be made by a medical officer.

This last session of the training focused on a caregiver's receiving a telephone call from a person who is threatening suicide or who has already harmed himself. In order to manage such callers properly, the caregivers were instructed to use the following procedures as guidelines:

(1) Always determine the location of the caller:

- "Tell me exactly where you are." One must learn the street address, apartment number, and town.
- If the caller is confused, ask him to "read the number in the center of the dial."
- Since the caller might lose consciousness due to his attempt to kill

himself, it is always necessary to obtain his location during the beginning of the conversation.

(2) Learn exactly what the caller did in order to harm himself:

- "Tell me what you took, how many? Read the label to me."
- Always ask about alcohol having been taken in combination with other drugs because such combinations are highly likely to be lethal.

(3) Inquire if anyone is nearby to help the caller:

- If anyone is available, tell the caller to "put that person on the telephone NOW!" Inform the person that you want the caller to be taken to the nearest hospital for an examination and treatment. Based on knowledge of available medical facilities and the location of the caller, it is safer to take the potential suicidal victim to the *nearest hospital* rather than to the nearest military medical facility.

(4) Tell the caller, if he is alone, to "open the door and leave it open for the ambulance personnel."

(5) Keep the telephone line open until assistance arrives. Clarify with ambulance personnel the hospital to which the caller will be taken so they can be prepared to receive him.

At the end of the presentation, the caregivers were informed that not all suicides are preventable. However, since the data indicated that 8 of 10 young persons had communicated their suicidal intent prior to harming/killing themselves, it is imperative that the caregivers ask directly whether a distressed person is currently considering suicide. Any service member responding positively to that inquiry should be escorted to the nearest medical facility so that a medical officer could assess the suicidal potential and initiate the appropriate therapeutic regimen.

Conclusion

Based on the increased number of referrals to the Naval Hospital, Cherry Point for evaluation of the suicidal potential of distressed service members who had initially presented to a nonmedical counselor, the author achieved a degree of success by increasing the awareness level of nonmedical caregivers regarding the need to refer or escort immediately any distressed individual who expresses suicidal ideation or intent. The increased number of such referrals probably also reflected or enhanced awareness about the Navy's policy that all potentially suicidal service members must be evaluated and managed by a medical officer. In the long term, the suicide rate among naval personnel could probably be reduced if nonmedical caregivers at all commands would become attuned to the "cries for help" from service members in managing any of the stressors or conditions associated with suicidal behavior.

References

1. Seaton LH, Harlow DL: *Self-inflicted injuries/deaths.* Joint Letter, Washington, DC, MEDCOM-343 and NMPC-66, 1983.
2. Hopkins BW: Running away from it all: Suicide among troubled youth. *Family Life Development,* 1983.
3. Shneidman ES, Farberow N: *Some facts about suicide.* Public Health Service publications 852, Government Printing Office, 1961.
4. McDermott WM: *Active duty personnel presenting to naval medical facilities with suspected suicidal ideation or behavior.* Washington, DC, NAVMEDCOMINST 6520.1, 1983.
5. Wasileski M, Kelly DS: Characteristics of suicide attempts in a Marine recruit population. *Milit Med* 147:818, 1982.
6. Datel WE, Jones FD: Suicide in United States Army personnel, 1979-1980. *Milit Med* 147:843, 1982.
7. Halton CL, Valente SM, Reink A: *Suicide: Assessment and Intervention.* New York, Appleton-Century Crafts, 1977, p 53. □

Logos Sought for Hospital Ships

It has long been a tradition for U.S. Navy ships to display with pride symbols of their purpose and mission. As the time draws near for the two new hospital ships to join the fleet, the Medical Department is seeking logo designs for USNS *Mercy* and USNS *Comfort.* The source for those designs will be the Medical Department itself. Personnel from all corps are encouraged to submit designs for either or both ships. Winning logos will be adopted as the ships' official emblems, and the winning designers will attend the commissioning ceremonies in San Diego as official guests of the Navy Medical Department.

Each submission must be an 8" x 10" color sketch, drawing, painting, or photo. Please include your name, address, office telephone (both Autovon and Commercial), and send to:

Hospital Ship Logo
MEDCOM-00D4
2300 E Street, N.W.
Washington, DC 20372-5120

Contest deadline is 10 Jan 1986.

Straight Talk About Military Retirement

Purposes of Current System

Primarily a force management tool:

- Serves as primary retention incentive for a military career.
- Provides youthful and vigorous combat force—Army promotion to 0-5 in 1931 was typically at age 54.
- Supports "up or out" promotion system which historical experience proved is necessary.
- Financially assists those who are forced to make a career change in mid-life.
- Part of compensation system for arduous and often dangerous life that military service demands—risk of life, family separation, PCS impact on spouse's career, children's education and home equity, long hours, no overtime.
- Provides portion of mobilization base since retirees are eligible for recall.

Myth: The Military Retirement system is an old age pension plan that can be compared to most other pension plans.

Fact: It is not. The military retirement system is an element of the compensation system required to maintain a youthful combat-effective force. Only as a secondary purpose does it provide old age support. Therefore, comparisons to civilian pension plans are not appropriate.

Statement by Dr. Lawrence Korb (ASD MI&L) before SASC on 19 March 1985:

"It is not simply an old age pension plan as found in other sectors, nor was it intended to be. In form, structure, and purpose it is different from old age income maintenance pension programs. There is no vesting, no capital accumulation, no deferred income provisions, no thrift features, and no matching supplemental plan. In short, it does not look, or operate, like a private sector retirement pension plan for a very good reason. It must serve national defense policy. It must respond to active force requirements, and provide sufficient incentive to permit the services to retain the right kinds and right quality of members. Comparisons made to other systems become suspect unless there is a commonality of purpose and requirement. Lacking that, any direct comparison simply becomes one of form and structure, not substance."

How Much Does System Cost and Who Gets What?

- DOD expenditures:
  - 1955 - $422M
  - 1965 - 1.4B
  - 1975 - 6.2B
  - 1983 - 15.9B
  - 1984 - 16.6B
  - 1985 - 17.2B
  - 1986 - 18.2B
- Increased 1955-1985 cost attributed to:
  - Inflation 55 percent
  - Wage Growth 21 percent
  - Retiree Population Increase 19 percent
  - Pay Adjustments 5 percent
- Typical retirement earnings before taxes and deductions for Survivor Benefit Plan participation:
  - 0-5 w/20 YOS $1,706/mo or $20,472/yr
  - E-7 w/20 YOS $802/mo or $9,624/yr
- Must work in second career; initially will earn 20-27 percent less than similarly educated and aged civilian who had benefit of stable career; gap narrows but never closes completely.

Myth: The current system is six times more costly than average private sector plans.

Fact: It is only 1.2 to 1.5 times more costly than average private sector plans. The greater cost results from the longer period that a military retiree receives retirement pay, not the size of the monthly paycheck itself. The longer period is driven by the requirement for a youthful force.

Myth: Service members retire with 50 percent of their pay at 20 years of service and 75 percent at 30 years.

Fact: Basic pay is only one element of military compensation and is not comparable to salary levels in the private sector. Reasonable comparisons can be made, however, to Basic Military Compensation (BMC). BMC includes Basic Pay, BAQ, BAS, and the tax advantage accruing to allowances not subject to income tax. While a 20-year retiree is entitled to 50 percent of basic pay, that value is only 38 percent of BMC. The maximum a member can receive is 75 percent of basic pay, representing 57 percent of BMC.

Myth: The Military Retirement System is lavish.

Fact: The typical military retiree serves 22-24 years on active duty and receives approximately $1,000 per month as retirement income. Forty-eight percent of current retirees receive retirement pay that is below the poverty level for a family size of four.

How Many Nondisability Retirees?

	DOD-Wide
1955	98,000
1965	377,000
1975	884,000
1985	1,100,000

- Based on projected manpower requirements, total retirees will stabilize at 1,300,000.

Who Retires?

- 13 percent of DOD accessions serve to retirement.
- 75 percent are enlisted; 25 percent are W-1 and above.
- Less than 5 percent of Navy retirees are 0-6 and above.
- 79 percent are nondisability; 21 percent are disability and Reserves.
- Average YOS for FY84 retirees:
  - Officer 23.98
  - Enlisted 22.58

Myth: Tax dollars would be saved if the earliest retirement point was moved to 30 years. Allowing service members to retire at 20 years results in losing them at their peak.

Fact: Total costs would increase for a 30-year system. The 20-year retirement is in effect a "reduced retirement." A youthful force is required to sustain the rigors of combat.

Primer on Cost of Living Adjustment

- Tampering with COLA is primary focus of most initiatives to change our retirement system since it results in immediate expenditure and federal deficit reduction.
- History: 1870—Recomputation of retired pay was in relation to active duty basic pay increase. 1963—Retired pay indexed to Consumer Price Index (CPI); same as Civil Service mechanism.
- CPI adjustment intended to protect purchasing power of *initial* retired pay . . . same as social security, VA benefits, and survivor annuities.
- Example: CPO retires in 1985 at age 41 and buys 10 bags of groceries with the retired pay on day of retirement. How many bags of groceries can this CPO buy in the future?

	Full COLA	1/2 COLA	No COLA
5 Percent Inflation			
2006/ Age 62	10	6	3.5
2017/ Age 73	10	4.5	2
10 Percent Inflation			
2006/ Age 62	10	4	1.5
2017/ Age 73	10	2	0.5

Significant Changes Enacted Since 1980

- Changed retired pay base to "high-3" vice final pay for those entering services after 7 Sept 1980. Reduces value by 10-13 percent.
- Eliminated 6 month round-up for years of service determination.
- COLA adjustments changed from semiannual to annual.
- Enabled states to divide retired pay as property in divorce settlements.
- Capped COLA at about 50 percent for retirees under 62 for FY's 83, 84, and first 3 months of FY85.
- Subsequently eliminated FY84 COLA.
- Delayed COLA adjustments from annual to every 13 months.
- Round down monthly checks to next lowest dollar.

Myth: The military retirement system remains unchanged and the Department of Defense refuses to consider change.

Fact: Since 1980 changes have been implemented that will reduce retired pay by 15-20 percent. DOD recently completed a comprehensive study of the retirement system and remains receptive to suggestions. However, most suggestions for change evaluate only the resultant cost savings and fail to consider the impact on the nation's ability to retain a ready, combat-effective force. We cannot accept change that will significantly degrade its ability to satisfy national security requirements.

☆ U.S. GOVERNMENT PRINTING OFFICE: 1985 - 491-639 - 128/20104

DEPARTMENT OF THE NAVY
Naval Publications and Forms Center
ATTN: Code 306
5801 Tabor Avenue
Philadelphia, PA 19120

OFFICIAL BUSINESS
PENALTY FOR PRIVATE USE, $300

Second-Class Mail
Postage and Fees Paid
USN
USPS 316-070

U.S. NAVY MEDICINE